

**UNIVERSITI TEKNOLOGI MARA**

**FUEL CONSUMPTION EFFICIENCY ANALYSIS  
BASED ON REAL TIME ONLINE SIGNAL  
MONITORING SYSTEM**

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## ABSTRACT

The raise in fuel prices has consequently led to the issue of fuel efficiency becoming an increasingly critical factor for fuel consumers. Numerous transportation companies and individual drivers therefore, resort to thinking of ways to save their travel expenses and try to find other alternatives. Hence, the purpose of this research is to invent a better method and system, which could eliminate the influencing parameters such as type of road/track, traffics, environment, weather, vehicle speed, acceleration, maneuver and even fuel pump station. All the parameters aforementioned will be constant except the kinds of fuel types which will be the main theme for comparison. Through the retrieval of the signals from CAN bus node such as signals for speedometer, odometer, engine revolution and the signal from the electronic control unit (ECU) to electronic fuel injection (EFI), the system could retrieve very accurate signals such as the fuel consumption in microliter/s and the traveling distance in meter/s, shorter test tracks such as 100 meters for low speed, 1 km for high speed and 2 km for acceleration test are seen to be sufficient. That is why the use of this system is less time-consuming and said to be very accurate to measure fuel consumption among different fuel types and even to compare the performance in terms of the time of acceleration. The Malaysian Automotive Portal has presented that the mileage of the target vehicle at constant speed of 90 km/h is 15.9 kilometers per liter. The results of testing indicate that the fuel consumption is 16.0 kilometers per liter. The difference is insignificant where the percentage lies around 0.63%. Once the system is on, all the data are calculated and the fuel consumption will be displayed on the 8 inch touch screen LCD monitor. The driver can very accurately understand the fuel consumption information immediately and they can optimize their driving maneuver and planning to overcome the fuel price issues. This is a very practical system to use for fuel saving measurement and options that really benefit in these times of rising fuel prices and can be implemented immediately to increase the fuel efficiency of the vehicle. The results of the idling and constant speed tests have shown that this research has identified that there are potentials for improving fuel efficiency.

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# CHAPTER I

## INTRODUCTION

### 1.1 Introduction

The raise in gas prices has consequently led to the issue of fuel efficiency becoming an increasingly critical factor for fuel consumers. Due to the transportation cost, most prices of products will increase as well such as prices for groceries, stationeries and etc. Knowing the actual transportation's fuel consumption (FC) (e.g. liter/100 km, amount of the fuel usage in liter per 100 km of distance traveled) or fuel economy (e.g. miles per Gallon (MPG), the distance traveled in miles per Gallon or more preferred by the Malaysians, the calculation according to price per kilometer), could help drivers to determine monthly fuel expenses and plan the budget more effectively. A lot of transportation companies and individual drivers therefore, resort to thinking of ways to save their travel expenses and try to find other alternatives. A study on Platinum-based additives has shown that by using the additives, the brake specific fuel consumption is reduced about 9% at 1300RPM, 5% at 1600rpm, thus the additives are seen to be better compared to the normal one. (Caton, Ruemele, Kelso and Epperly, 1990).

Fuel additive is one of the cheapest and easiest solutions and there are two types of additives which are offered in the market, one of them must be added to the fuel tank in certain amount and another additive is readily mixed as purchase-able at fuel stations